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AVIATION

The Oldest American Aeronautical Magazine

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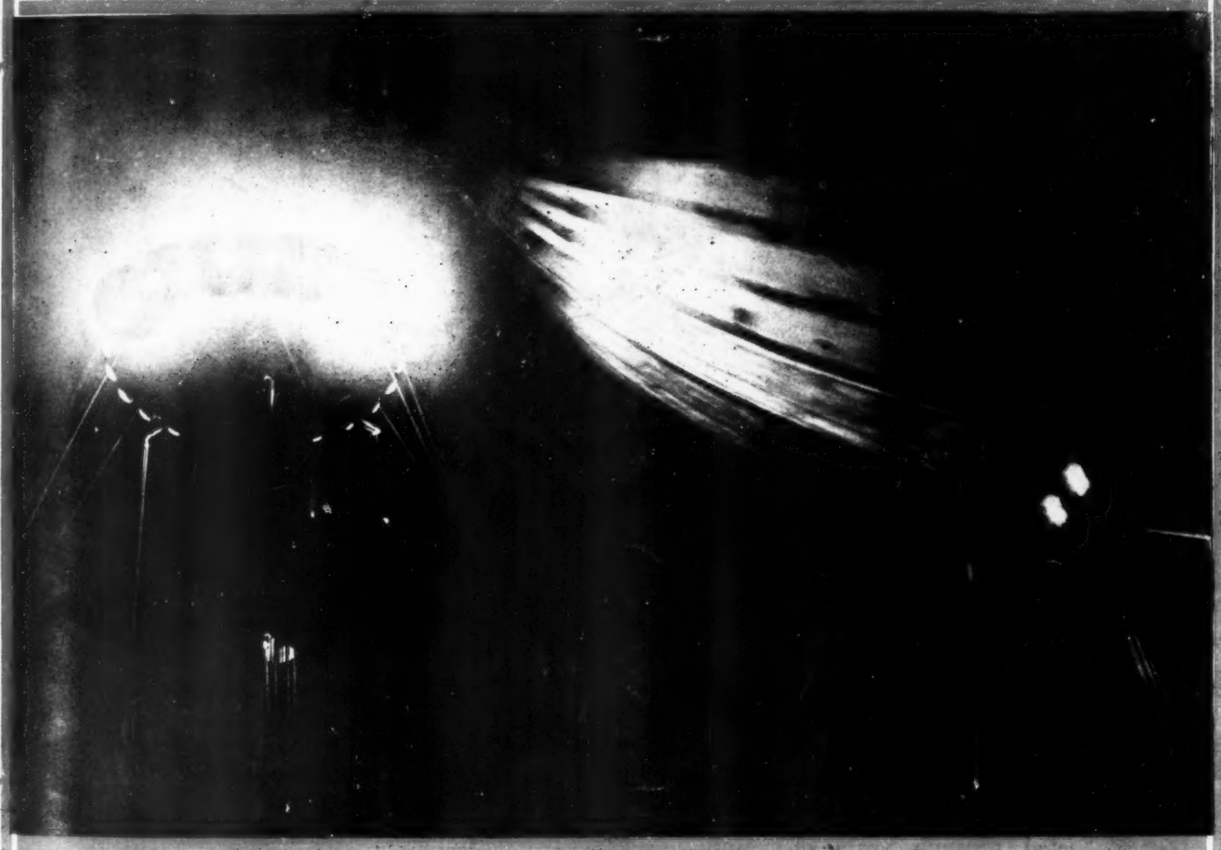

The U.S.S. Shenandoah making a night mooring to the Lakehurst mast (see page 912)

VOLUME XXI NUMBER 22

SPECIAL FEATURES

LIGHTING OBSTRUCTIONS DANGEROUS TO AIR NAVIGATION
METAL V. WOOD PROPELLERS
THE LIZETTE SPORT PLANE

GARDNER PUBLISHING CO., INC.
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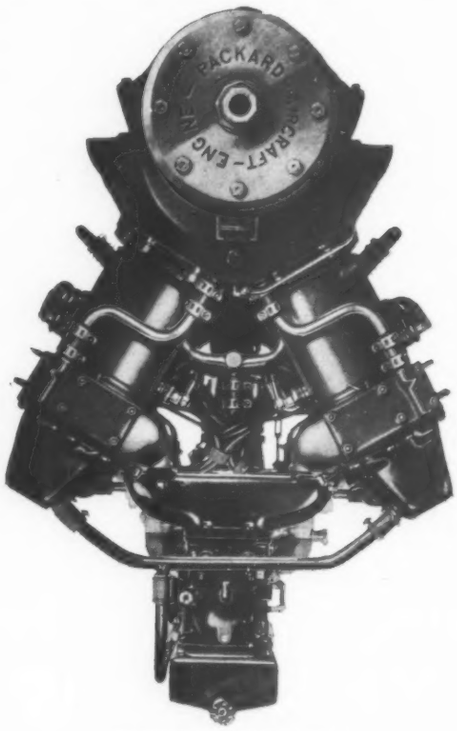

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NOVEMBER 29, 1926 **AVIATION** VOL. XXI. NO. 22

Published every Monday

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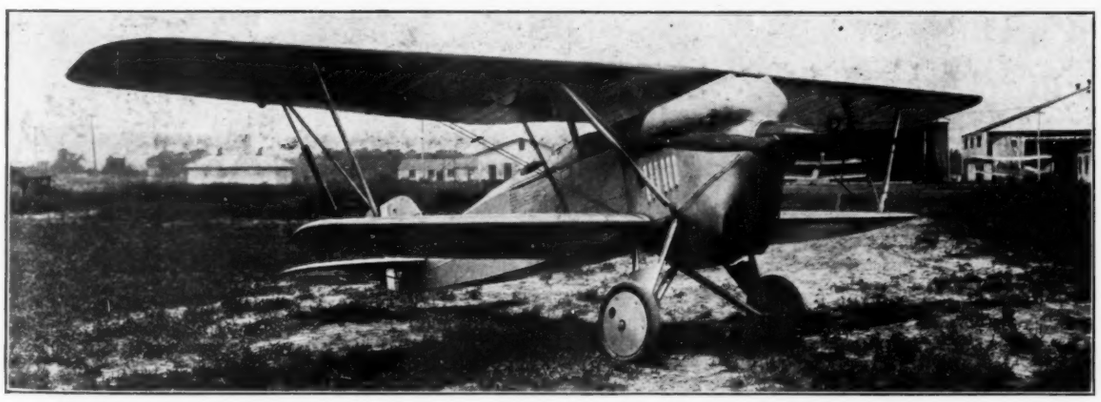

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VOL. XXI NOVEMBER 29, 1926 No. 22

Air Racing and National Defense

NOW THAT the 1926 Schneider Cup race is a thing of the past but while Italy's win is still vivid in our memory, the time is most opportune for some thought to be given to our future attitude toward this international contest. Public interest in the Schneider Cup race has been stimulated because more space was given in the daily papers to news relating to the event than to any similar competition.

The first question to be decided is whether or not America's participation in the Schneider Cup race is worthy of the effort, both financial and otherwise. In endeavoring to find the answer to this question, it is really only necessary to consider what Italy, as a nation, has gained as a result of her victory this year. Last week we emphasized the international prestige in the air which must have accompanied Italy's performance at Hampton Roads recently. There is absolutely no doubt whatever that, in future questions of international policy—in the deliberations of the proposed International Disarmament Conference next year, for example—Italy's voice on topics of air defense will be listened to with far more concern and attention than it ever has been before. If this is the case, then, it is obvious that international prestige immediately becomes a factor to be considered under the general heading of national defense.

Italy's effort in the Schneider Cup race has been reported to have cost her about $500,000. This figure is, undoubtedly, extremely moderate, the reason for which is clear to anyone who saw the Italian racing seaplanes this year and was able to compare them with the Macchi racing planes which came to Baltimore last year for the Schneider Cup contest. The advance that has been made during the year is astonishing and it is this excessive development which has been responsible for the extremely high cost. To the United States the cost per year of defending the Schneider Cup since it was captured in 1923 has not been anything like as much as Italy's outlay this year because of the use of the same planes for the Pulitzer races, but the cost to this country of challenging the speed honors of the World in the future will be high if we keep up with new developments though it will not cost Italy one quarter as much to defend her position in the 1928 Schneider Cup contest, which will be the next, as it has cost her this year.

This country spends large sums on its defense each year, not because we expect a war but because we realize that international prestige is one of the surest means of averting war. Before the 69th Congress adjourned earlier this year it authorized the appropriation of a total of approximately $164,000,000 on our air defense, involving five year procurement programs for both Army and Navy. Comparatively speaking, a mere fraction of this amount, appropriated in new funds, and devoted to the building up of our laurels in international competition in the air would more than justify its expenditures when viewed from the standpoint of national defense.

But, as already intimated, development work for the 1928 Schneider Cup contest, if the most is to be obtained from the financial outlay, must be begun at once. The development of high speed planes must be carried on by private enterprise and, for best results, the whole aircraft industry should have the opportunity of participating. We have the finest pursuit planes in the World today largely because of the competition between the Boeing and the Curtiss companies, each firm realizing that when it produces the better pursuit plane it will get the major part of the Air Corps requirement. Several prominent aircraft constructors, at Norfolk, expressed their readiness to develop speed planes capable of over 300 m.p.h. Why not organize a national elimination speed contest in 1927, one year before the next Schneider Race, and thus encourage the maximum of development and commence to build up, on a sound footing, America's air supremacy and create for her an international name in the air which will be worth so much to her national defense?

Henry Ford And Air Power

TO HAVE what may be considered as an authoritative statement of Henry Ford's objective in his aeronautical work is of very great interest. In a signed article Mr. Ford, while being interviewed by Samuel Crowther said:

"The example of the United States in the matter of wages and prices ought to go far toward changing the world. But unless we are ready to defend ourselves we shall not have the chance to work out our example. That is the reason why I am interested in airplanes.

"The airplanes may and probably have commercial possibilities. But the commercial side does not interest me excepting as it is bound up with the defense of the country. For our best defense will be in our ability to produce thousands of airplanes at short notice—and to have the men who know how to manage them.

"If we develop the biggest potential air force in the world—a force so large that no force can avail against us—and if we also develop our nitrates so that we may have explosives, then we can prevent war."

The mixing of the wage problem with commercial aviation and war is certainly a true Ford point of view. It throws a very interesting light on the motive behind the construction of the Ford airport, the mooring tower and the model aircraft factory. If Henry Ford had merely installed these aerial accessories as an insurance protection, the same as he has sprinkler systems in case of fires—he would be making a good investment.

During the last war the Ford factories made some of the best Liberty engines. In case of another war, with the experience gained in their present experimental development of aircraft, the Ford industries should become one of the most effective sources for aerial munitions.

The Lighting of Obstructions Dangerous to Aerial Navigation

By CAPT. C. H. BIDDLECOMBE
A British Air Ministry Expert on Air Transport

AS THREATENED in a former issue of AVIATION, (April 12, 1926) the writer will continue the story of one phase of his activities in the development of Air Transportation under the British Government.

This was the marking of "the reefs of the air"—these being tall radio masts, lofty chimneys and similar obstructions on and near airdromes and air routes.

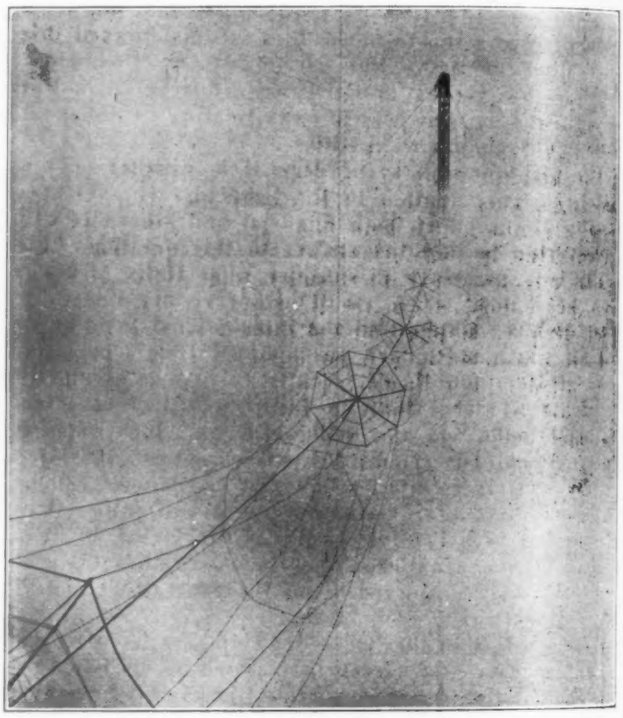
The subject first engaged my attention in 1917, when an acquaintance—one Major Losse de Ville—flew a Sopwith Schnieder single seat seaplane into a tall mast at Horsea Island, near Portsmouth. The Radio Station here is equipped with four wooden masts, 440 ft. high and spaced to cover an area some quarter of a mile square; on the day in question, the clouds were down to about 250-300 ft. and horizontal visibility was poor.

A Case in Point

The Radio Station lay near de Ville's course, and his first intimation of the proximity of the masts was a shattering crash—then darkness. The sequel—including the amazed bewilderment of the Radio staff, de Ville's rescue unconscious by a plucky sailor, the removal of the machine piecemeal, and the repair of the mast, is another story, but the incident remained in my mind until my appointment to the Civil Aviation staff of Major-General Sir F. Sykes in December, 1918. To this staff was entrusted the development of air transport throughout the British Empire—no small task, incidentally, and to make flying safe was our chief endeavor; amongst other safeguards was the lighting of air routes near at home, the London-Paris route particularly, and other areas where aircraft might reasonably be expected to fly after dark.

I took in hand the obstruction light question as soon as circumstances permitted, and, after much delay, obtained the necessary authority to proceed with the actual work. The delay was largely due to legal technicalities—the doctrine usque ad coelum holds good in most countries, and never before had this right been impugned, except perhaps in the case of the Tower of Babel. So that much time elapsed before I could get through the usual channels the power of placing lights on various radio masts throughout the section of England most flown over. The principle adopted was that only obstacles on and near routes should be lighted; that in the case of existing dangers the Air Ministry would bear the cost of lighting them; and that obstacles erected subsequent to a particular date should be lighted at the expense of the owner. To date these regulations have been enforced only in the case of masts on routes and of unusually tall isolated smoke-stacks near airdromes; no obstacles in or very close to large towns, and less than 250 ft. above ground, will be lighted; but in dealing with isolated structures of less height, such as a lofty church steeple on a hill in a small town near a much used airway, each case will be considered on its merits. The lighting of obstacles other than radio masts is, of course, a fairly simple matter where electric current is available, although this latter, by the way, is not by any means generally obtainable in England. For instance, the lighting of a chimney about 100 ft. high immediately adjacent to the Croydon Airdrome was carried out by a ship's lantern burning kerosene oil and hoisted every evening. Incredible though it may seem in this country, where the use of electricity has been developed on such a huge scale, the important water-works pumping station to which the chimney belongs is without electric light, and the cost of carrying current to the chimney was considerably greater than the expenditure involved in using nearby labor for the oil-lamp maintenance.

Turning to radio masts again, I met with further problems. The masts at Horsea are of wood construction in order to obtain the perfect insulation required at this station, and I was unable to place electric lights on them owing to the fact that the presence of electric cables connected to earth would seriously impair the advantages of insulation. The obvious



One of the 820 ft. masts of the British Post Office Rugby radio station, England, showing how serious a hazard such obstructions represent to air navigation. The mast and wires are seen peering above the mist.

solution was to employ the A.G.A. System, as this type of unattended automatic apparatus had been thoroughly tried out on the London-Continental route with remarkably good results; the installations used were especially designed for the purpose, due consideration being given to the factors of windage and weight involved in placing them at the top of a mast over 400 ft. high.

Maintenance Problems

In addition, the problem of servicing the lights by the provision of fresh cylinders of gas annually was of prime importance. To haul cylinders weighing 230 lbs. up and down the masts during the Winter is an operation requiring careful forethought and soundly designed equipment. The candlepower (nominal) of each light, the distribution of that candlepower through the most useful arc, and, most difficult of all, the designing of ventilation, which would obviate any fouling of the burners, and eliminate the light being blown out or extinguished by the vibration of the mast during Winter gales, were matters demanding much careful experimental and test work. The eventual result was that each mast is equipped with a light of 150 E.S.C. white in color, having a characteristic of 1/10th second flash, 9/10ths second eclipse, and being in constant operation day and night. The illumi-

nant—dissolved acetylene gas—is contained in three A-50 type A.G.A. cylinders of 200 cu. ft. capacity each, the whole being suitably mounted as a self-contained unit at the mast head, together with all necessary piping, valves, flashers, mixers and regulators. Permanent hoisting gear is fitted on each mast, and the whole system has proved satisfactory.

At the same time, I considered that the provision of a light at each mast head was insufficient, having regard to the particular area in which the masts are located. A Neon beacon of experimental design was therefore placed on the ground in the area contained within the masts. This consists of 8 Neon-filled glass tubes laid horizontally across a framework 2 ft. 6 in. above ground level, each tube being 20 ft. long and 32 m/m in diameter. The tubes are illuminated by high-tension electric current on the well known principle developed by Claude, the French scientist, are suitably protected from damage by objects falling from above, and are switched on and off by personnel at the Radio Station. The character exhibited by the beacon is: Flash 1 sec., eclipse 1 sec. The results obtained by the combination of the two systems are entirely adequate, the Neon beacon giving ample warning to an approaching flier on a night when atmospheric conditions would seriously diminish the range of any other type of light, and the masthead lights subsequently indicating the exact location of each mast, an essential factor in that particular area.

Other Masts Lighted

Simultaneously with the work at Horsea, the plans for lighting five other radio station masts were put in hand; technical objections to the presence of electric cables on these masts were not quite so serious as at Horsea, as, although the masts were insulated, they were all of steel construction and it became necessary only to provide against interference with this insulation.

At the great Post Office Station at Rugby, with it's twelve masts towering up to 820 ft. above ground and spread over a very large area, insulation is obtained by resting each mast on a huge glass sphere, the specially designed base of the mast resting in a socket in the sphere. The surrounding concrete base provided a platform on which to place an electric generator to provide current to the lights, the generator being actuated by an insulated drive coming from outside the concrete area and deriving its power from the current available from the main powerhouse of the station. This system avoided the objections to the presence on the masts of electric cables having any earth connection, and proved satisfactory in operation.

Of the twelve masts, three are lighted, as the cost of each lighting unit rendered it necessary for me to limit the lights to the safe minimum; the three masts selected are so positioned in relation to each other and the remaining nine that the outer boundaries of the danger area are clearly indicated.

Details of Equipment

Each of these three masts is fitted with two lighting units, one at the masthead (820 ft.) and the second at 600 ft. above ground level; the upper unit is a fitting containing four 500 watt lamps, arranged two pairs in parallel with a hand change-over switch at ground level. The fitting is so designed and positioned as to be watertight and storm-proof, to provide adequate ventilation, preventing undue condensation, and to give the maximum possible area of visibility of the light—nearly 360 deg. in azimuth, and over 90 deg. in the vertical plane, i.e. from below the horizontal to the zenith. The light exhibited is of a nominal 1000 E.S.C., white in color and having a character of: flash 1 sec., eclipse 1 sec.

The lower unit has a similar fitting, but contains four 250 watt lamps, arranged pairs in parallel with hand operated change-over switch; the light exhibited here is of a nominal 500 E.S.C., being identical with the upper light in other respects.

I have observed these lights from the air at night at distances up to 25 miles, on what in England is termed a "clear dark night," but which in many parts of this country would undoubtedly be considered a hazy atmosphere.

At the Northolt Radio Station, I found it sufficient to light one tubular steel mast, 300 ft. high, with a light at the mast-head. This unit consists of a fitting containing four 100 watt lamps, arranged pairs in parallel with change-over switch; the light exhibited is of a nominal 200 E.S.C., being similar to the Rugby lights in other respects.

At Daventry, two steel masts, 500 ft. high, were fitted with one light at each mast-head, identical in all respects with the Northolt installation.

The Somerton Station, owing to the number of masts and their layout, required the lighting of five steel masts, of 275 ft., each being fitted with a mast-head lantern containing four 1000 watt lamps, arranged as at Rugby, and exhibiting a light of similar color and character.

Most Suitable Color

Experimental work on the question of the best color for all lights was carried out at Ongar, in Essex. The station here required the lighting of seven steel masts, for various reasons, and I had placed at each mast-head—300 ft. above ground level—a fitting containing four 100 watt lamps, arranged in the usual way. Each light exhibited was of 200 E.S.C. (nominal) and had a character of: flash, 1 sec., eclipse, 1 sec.

Owing to the location of the Ongar station, to the North-east of London, the Southwest wind prevailing to a marked extent in that part of England brings the London smoke haze and river mist over Ongar with steady regularity. In addition, the low-lying marsh land of Essex produces its own mist and fog, so that the station was well placed for my experiments.

Of the seven masts lighted, three were provided with white lanterns, two with red, and two with orange lights; the red lanterns were of standard ruby red signal glass, while the orange dome glasses were constructed of a glass having an absorption factor of about 45 per cent.

After a great deal of night flying in variable weather conditions, I came to the conclusion that under average atmospheric conditions in Southeast England, the orange color is not more readily distinguishable than a red or white light, and that for all-round use the white light was preferable. The flashing red light, when seen, was very distinctive, but was not seen at as great a distance nor as frequently under adverse conditions as the white light.

I also found that whereas the ruby red glass domes were quite as robust and had as long a life as the white glass, the orange tinted glass employed was very susceptible to breakage under changes of temperature, due to varying weather conditions. This fault appeared traceable to the fact that during manufacture the orange color is obtained by heat treatment of the glass, which renders it difficult subsequently to anneal the glass satisfactorily; as frequent renewals of the glass domes are costly and inconvenient, the orange color was abandoned in favor of white.

In addition to equipping radio masts with lights, I decided that it was advisable to place a "Warning Beacon" at ground level in the vicinity of the masts; this is more particularly the case where masts are of a height of 300 ft. or more, as the prevalence of low cloud in England during the winter months lessens considerably the distance at which mast-head lights can be seen under average flying conditions.

Neon Gas System

The apparatus most suitable for use as a Ground Beacon is undoubtedly that employing the Neon gas system as an illuminant, suitably developed to meet aeronautical requirements; it is probable that a Neon beacon, similar to that at Horsea Island, will eventually be standardized for use at all radio stations where the provision of obstruction lights is necessary. Electric current is always readily available at such points, as is the small but regular amount of semi-skilled labour required for the maintenance of the beacons. In the case of electric mast-head lights, it is essential to provide a fitting containing two alternative circuits, each supplying current to independent illuminating agents so that in the event of

an interruption in one circuit, owing to a broken or burnt-out lamp filament, etc., the second emergency circuit can immediately be brought into operation and light the "stand-by" lamp or lamps.

The difficulties and delays inseparable from renewing lamps on high masts during adverse weather conditions, or when radio reception and transmission are almost continuous, make this precaution imperative. With the A.G.A. type of apparatus, the very high standard of reliability added to the factor of unattended automatic operation over periods of twelve months, makes a "stand-by" light merely a desirable, but non-essential, luxury.

The early system of controlling the hours of operation of the lights by having them switched on at night and off at dawn by personnel at the radio stations cannot be regarded as satisfactory, and developments were put in hand directed towards the production of an entirely automatic control for all mast lights and ground beacons, to bring the lights into operation on the advent of darkness and extinguish them at dawn. In addition, this light valve control will bring the lights on in misty, etc., weather, when the visibility falls below a pre-determined figure.

Clock Control Unsatisfactory

The use of time clocks for this purpose is unsatisfactory. Exhaustive tests showed that this type of apparatus had various defects. The time of switching the lights on and off is a fixed factor over a given interval between adjustments, and ignores the very frequent occasions when darkness comes earlier than usual in the evening or remains later in the morning, owing to weather conditions. The clock does not function in the daytime when the weather may render it desirable to operate the lights, and is also in most cases irregular in operation after the lapse of a given period since the last rewinding, due to the changes of spring tension; severe low temperatures also cause irregularity—and the periodic rewinding and adjustment compares unfavorably with the long periods—up to five years—over which a Dalen light valve will operate with no attention of any kind.

As with a marine lighthouse, but to a much greater degree, the first essentials of any aerial beacon or danger light are regularity and reliability. Lacking these factors, a light used for the guidance or safety of pilots immediately becomes a potential grave danger. The flier is given a false sense of security and is quite possibly led into dangers which would be avoided if the supposed aids to safety were completely non-existent.

The cost of the various installations described was, of course, considerable, but in aviation lighting work as in all other phases of life, the experienced man considers first the quality of service rendered and the recurring expenditure to maintain that service and is not unduly influenced by initial cheapness.

The Cover Picture

The cover picture of this week's issue of AVIATION shows the U.S.S. Shenandoah making a mooring to the Lakehurst mast at night. In connection with the details on the lighting of this mooring mast, the following, transmitted by the Navy Department, is of interest:

Immediately under the platform at the top of the mast there are two rows, of twenty-four each, of standard 1000 watt projectors. The lower row is set at 15 deg. 40 min. down from the horizontal and the upper row 16 deg. 4 min. from the horizontal. This throws a circle of light for a 1000 ft. radius on the ground around the mast, thus illuminating the mooring blocks which are placed at that distance from the foot of the mast. These standard 15 in. projectors are 150 ft. from the ground. Each row of lights is controlled by an independent switch from the operating platform at the top of the tower. In addition, there are six incandescent white marker lights on pipe standards around the platform landing. These are for the purpose of outlining the platform and for platform illumination.

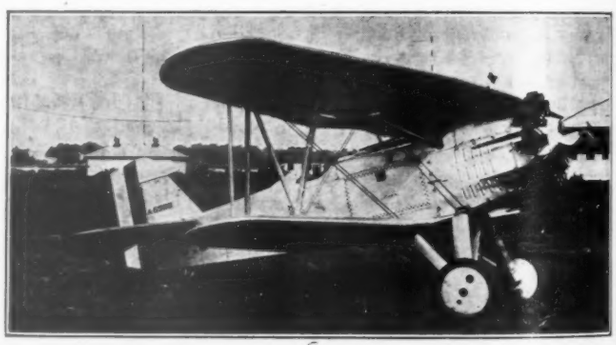
Wasp Engined Hawk Completes Test

Equipped with a new Pratt-Whitney 400 hp. radial air-cooled engine, a Curtiss Hawk, one of the Navy's latest fighting planes, has just completed a satisfactory test under supervision of the Bureau of Aeronautics. The plane was flown by Lieut. Ralph A. Ofstie, U.S.N., a test pilot in the Bureau, from Washington to San Diego, thoroughly inspected and tested by the operating personnel in the fighting plane squadron of the Battle Fleet, and has been flown back to Washington by Lieutenant Ofstie, the entire test covering a month.

The trip West commenced on Oct. 6, and was made over the southern route, going via Dayton, Belleville, Muskogee and across Texas, and along the border to San Diego. On the completion of work at San Diego, the plane was flown to Seattle along the inland route via Bakersfield and Medford. The return trip from Seattle was made via Boise and Salt Lake, thence East over the air mail route to Iowa City, then to Dayton and back to Washington. The total flying time for the round trip was about 65 hr., covering a total of approximately 7,000 mi.

Although the trip was made rather late in the year, unfavorable weather conditions were encountered only in the Northwest, where heavy ground fog resulted in considerable lost time and roundabout courses. The plane proved to be an excellent cross country ship, no difficulty being experienced with the high fields encountered in the mountain regions. No plane maintenance was required at any time during the trip.

The Pratt-Whitney engine proved to be remarkably satisfactory for this service from the time of leaving Washington until the return. The only work done was the removal and inspection of spark plugs at San Diego. Nothing was required beyond filling the fuel tanks and cranking up the engine.



The Wasp engined Hawk which recently completed the cross-country test flight.

The combination of the Curtiss Hawk with the Pratt-Whitney Wasp engine was very well lined by the operating personnel of the Battle Fleet. The decrease in weight of the power plant improves the performance by the elimination of the cooling system with its attendant radiator and mass of piping greatly simplifies the maintenance problem and materially increases the performance.

Should the engine continue to give the excellent results which have been indicated by experience to date, it is probable that a number of combinations can be made with this engine and other types of naval planes.

Flags for Airliners

According to recent reports, British air liners are to fly an ensign which will be specially designed as the flag of Britain's air fleet. Experiments are being carried out on Imperial Airways planes with flags of various materials. They are fastened to the struts between the wings of the machines.

When a really reliable material to withstand the wind forces is found [if ever—ED.] the air flag will be designed and fitted to all British air liners.

Metal v. Wood Propellers

Letters by: R. B. C. Noorduyn, Atlantic Aircraft Corporation, T. P. Wright, Curtiss Aeroplane and Motor Company

THE EXTENSIVE use of metal propellers, both in commercial and in service work, renders experience gained with this type of propeller in general of very considerable importance. The subject of recent metal propeller failures which have occurred in a few individual cases was discussed in AVIATION, Oct. 25, by T. P. Wright and his article has brought forth some very interesting and valuable correspondence.

The following letter was received from Mr. Noorduyn:

In your issue of Oct. 25, an article appears by T. P. Wright on the subject of reported failures of meal propellers. Rushing into print with second hand information, Mr. Wright seizes upon the so-called "overlap" of the propellers on three-engined airplanes as an explanation for these metal propeller failures and goes on from there to assume the existence of the same trouble, from the same cause, with all types of propellers.

Apart from the fact that such metal propeller failures have occurred in several instances on single-engined aircraft, it seems a pity that Mr. Wright did not seek some *first hand* information from those with extensive operating experience of three-engined planes such as we could have given him, based on a mileage of something over 100,000 before committing himself to statements which are disproved by the facts. However, he has it coming to him now, so here are the facts, contrasted with his statements:

1—Mr. Wright states: "United States military practice, as well as general European practice discourages such construction," whereas: the United States Army has ordered three (3) three-engined Fokker airplanes, and one has also been purchased by the British Air Ministry. Neither of these Government agencies has the reputation of spending their money on equipment of which they do not approve in principle.

Compares Wood Propellers

2—Mr. Wright states: "it is an open question whether any propeller can be made strong enough to withstand the stresses caused by overlapping," whereas: Hamilton wood propellers, standard on Fokker Trimotors, invariably run until the effects of long periods of flying through rain, snow, etc., make it necessary to recondition them. The average running time between such overhauls, taken during the operation of the Philadelphia Rapid Transit lines during the exceptionally unfavorable weather which has prevailed this fall, is over 150 hours. On the *side engines* of Commander Byrd's Fokker Trimotor, now on a 7,000-mile tour of the United States, the original Hamilton propellers are in use which were used in the Ford Tour of 1925, and on the subsequent flying around the eastern part of the United States and down to Florida and Cuba, amounting to a total of some 17,000 miles to date.

3—Mr. Wright attributes the failure of metal propellers to stresses on the side engine propellers caused by the slipstream of the front, center, propeller. Whereas: we recently removed a cracked metal propeller from the *center* engine of Commander Byrd's ship. The crack was discovered thanks to the instructions for inspection issued by the Curtiss Company, and described in Mr. Wright's article.

4—The specific case of failure on a three-motored ship, (not a Fokker), featured in Mr. Wright's article, was in our opinion due in great part to other causes than the flexibility of metal propellers and "overlap."

5—We are in complete agreement with Mr. Wright in his view that the "forged hub type" of metal propeller will probably eliminate the trouble which has occurred with "twisted slab" type and that it will allow the unquestionable advantages of the metal propeller on the score of weather resistance and efficiency at high engine speed, to be realized.

Mr. Wright Replies

The following letter, in reply, was received from Mr. Wright:

I wish to acknowledge receipt of your letter of Nov. 3 inclosing a copy of Mr. Noorduyn's letter of the first. I am indebted to you for the opportunity of presenting my comments on Mr. Noorduyn's remarks, and shall be pleased to have you print my views as appearing herein at the time you present Mr. Noorduyn's letter to your readers. I am sure the frank discussion of all phases of a complex subject such as the metal propeller cannot but be of interest and perhaps of real benefit to many interested in aeronautics.

I wish to make clear that the article on "The Durability of Metal Propellers" in the October 25th issue of "AVIATION" was not hastily prepared and remains, I believe, substantially correct. I mentioned that of the three failures reported to me, two occurred on single engined airplanes and one on a three-engined airplane. I indicated that since failures of any

One of the two all-metal PN-10 flying boats (two Packard 1A-1500, 500 hp. engines) which left Norfolk, Va. for Panama under the command of Lieut. Comdr. H. T. Bartlett, U.S.N. on Nov. 23.

kind had occurred careful study of causes was in order. I then mentioned the long number of hours credited the failing propellers of the single engined machine and the small number for the propeller of the three-engined machine, advancing the argument that as applied to the general problem the latter failure could be discounted on the basis of the particularly severe conditions which maintained due to the added stresses caused by overlap. It is to this statement that Mr. Noorduyn takes exception.

Of course, it is evident that the sketch appearing with the article was intended as a general illustration of the point under discussion and was in no way intended to illustrate a Fokker or any other specific airplane. Contrary to the implication of the second paragraph of Mr. Noorduyn's letter, I did seek first hand information on all metal propeller failures of which I was aware, including information from those connected with the production of three-motored airplanes. It was as a direct result of this that I felt justified in drawing the conclusion that excessive vibratory stresses are set up in any propeller which is partially in the slipstream of another propeller. It is my understanding that as a result of the independent research on the subject carried out by Mr. Stout and his associates, that the latest Ford three-motored airplane has the motors so located as to eliminate the overlap, which I have claimed is a possible source of trouble for the after propellers.

Wood Propellers Absorb Vibration

I appreciate that the material and usual design of wooden propellers makes them inherently better adapted to absorb vibration stresses than metal propellers. However, it should be borne in mind that the general discussion involved has to do with hours of flight of over 500 rather than of 150 mentioned with justifiable pride by Mr. Noorduyn. It was for this reason that I sought and I believe found a cause for the premature failure of the propeller in the three-engined ship mentioned.

I believe it will be agreed that the experimental purchase of airplanes by the United States Army does not necessarily commit the Air Corps to the future acceptance of all features of the first articles. Experimental contracts are, it is believed primarily awarded for the purpose of permitting Air Corps engineers to study at first hand the article purchased. Cases have arisen in the past in which after such study, and at the time specifications for further articles of the general type were prepared, changes have been incorporated. In short, it should be, and I believe is, the practice of the Air Services to base general specification requirements on experience. This means the constant revision of design handbooks following the experience gained on specific airplanes. In my article in referring to United States military practice (in connection with overlapping propellers), I used the word "practice" purposely, rather than the word "requirement" which would imply a not yet existing specification.

Regarding European practice, I can quote as an example from a description of a plane produced by one of the best known firms of Great Britain. I refer to a description taken from the June 10th issue of "Flight" covering the new De Havilland Commercial Biplane, the "DH 66" powered by three Bristol Jupiter engines. The passage referred to follows:

"A reference to the front elevation of the airplane will show that by so arranging the design, that the central engine is considerably above the level of the wing engines, it has been possible to avoid overlapping of the propeller discs without placing the wing engines excessively far out from the fuselage. Experience with three-engined airplanes seems to show that flutter and vibration are apt to occur when the propeller discs overlap, and in the D.H. 66 there should be no trouble on this score, as the slipstreams should clear one another by a considerable margin."

It should be appreciated that when the term "overlap" is used reference is made to the actual contact of the blades of the following propellers with the slipstream of the leading propeller. Propellers which in front elevation slightly overlap may not overlap at all in the sense of the above definition due to the necking down of the slipstream back of the leading propeller. In general, the amount of this diminution in the diameter of the slipstream may be taken as 0.8 D (propeller) at a distance of 0.5 D or greater back of the propeller. It is the above fact combined with the general problem of propeller stresses and vibrations which makes desirable and necessary the use of a smaller diameter for the following propeller of a tandem combination. The nature of the stresses set up in the after propellers of an overlapping combination are analogous to those set up in the after propeller of a tandem combination when in the latter case a sufficiently small diameter to prevent the tips from extending outside of the slipstream is not provided. Dr. H. C. Watts in his book "The Design of Screw Propellers for Aircraft" explains the action as follows:

"The speed of air passing the blades of the latter will vary periodically during one revolution, thus tending to set up vibration due to the consequent variation of thrust. There will also be loss of efficiency due to differences in the angles of attack of the various blades. To avoid this the following propeller should have such a diameter that it lies wholly within the slipstream of the leading propeller."

In view of information at hand a careful review of my article in the light of Mr. Noorduyn's comments, fails to convince me that it is in error. The purpose of the article was to present to those interested in aeronautics my conclusions with regard to certain recent metal propeller failures reached only after careful study and consideration. I sincerely hope that the statements of my article as well as those appearing above will be found of interest and benefit to some readers. Certainly the predominant position held by metal propellers in the aeronautical field today warrants a discussion of any problems concerning them which has arisen, as their merits are known and appreciated by all.

Tests on Navy Type Propellers

Tests on Thirteen Navy Type Model Propellers, is the subject of report 237, compiled by W. F. Durand, and issued by the National Advisory Committee for Aeronautics.

The tests on these model propellers were conducted at Stanford University under research authorization of the National Advisory Committee for Aeronautics and were undertaken for the purpose of determining the performance coefficients and characteristics for certain selected series of propellers of form and type as commonly used in recent Navy designs.

The first series includes seven propellers of pitch radio varying by 0.10 from 0.50 to 1.10, the area, form of blade, thickness, etc., representing an arbitrary standard propeller which had shown good results.

The second series covers changes in thickness of blade section, other things equal, and the third series, changes in blade area, other things equal.

These models are all of the standard 36-inch diameter employed in this laboratory.

A copy of this report may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

Giant Rumpler Seaplane Projected

At a meeting of the Society for Scientific Aeronautics, held recently in Berlin, Dr. Rumpler, one of the oldest and most successful of Germany's airplane manufacturers, stated that he was planning to build what would probably be one of the largest planes ever constructed, incorporating new principles of structural design and weight distribution.

Dr. Rumpler claims that the plane will be able to fly from Berlin to Rio de Janeiro in about 80 hr., or 3½ days allowing for stops. Steamships take about 3 weeks for the same journey, the projected ship being able to make the trip from Hamburg to New York in 36 hr., including a 5 hr. stop-over at the Azore Islands.

The new machine, which is to be a seaplane, is to have 10,000 hp. derived from 10 motors at 1,000 hp. each, will carry 136 passengers, 6,000 kilos of freight, 37,000 kilos of fuel, and will have a speed of 270 k.p.h.

Honor Calbraith Perry Rodgers

Aero Club of Pittsburgh Dedicates Tablet

BY RAY A. TUCKER

AVIATION *should receive part of the credit for the naming of the Pittsburgh Airport "Rodgers Field", in honor of Calbraith Perry Rodgers, as his name is listed among several in an editorial in* AVIATION *of Sept. 24, 1923, in which it was suggested that new fields be named after early aeronautical pioneers.*

The Aero Club followed this suggestion through, as you may readily see, from this article. From Letter of Aero Club of Pittsburgh.

On Friday evening, Nov. 5, before a large audience, the newly elected Board of Governors of the Aero Club of Pittsburgh carried out an interesting program in connection with the unveiling and dedication of a bronze plaque in memory of Calbraith Perry Rodgers, who in 1911, made the first transcontinental flight. This occasion marked the fifteenth anniversary of his historic flight.

The ceremony and program took place in the Carnegie Museum of Pittsburgh, with Mr. Raymond M. Marlier, president of the club, presiding. The plaque was unveiled by Rodgers' mother, Mrs. Marie Chambers Rodgers, who though in ill health, made the trip from Atlantic City in order to be present. The plaque has been placed on a column closely adjacent to where Rodgers' transcontinental ship has a permanent resting place in the museum.

Resolution Passed

The Pittsburgh Municipal Airport was named "Rodgers Field" in his honor, at the suggestion of the Aero Club of Pittsburgh, through the following resolution passed by the club on November 11, 1923:

WHEREAS: Aviation publications of national circulation are reminding those responsible for establishing flying fields that certain famous pioneers of the art of flying should be remembered in the naming of new fields, and

WHEREAS: This reminder includes, among others, the name of a Pittsburgher, Calbraith Perry Rodgers, who was the first man to fly from the Atlantic to the Pacific Oceans across the United States and whose plane has been given a permanent resting place in the Carnegie Museum of this City, and

WHEREAS: Calbraith Perry Rodgers had, before his accidental death in 1912, contributed greatly to the practical element of the science of that other Pittsburgher, Dr. Langley of the Allegheny Observatory, and had established records which, as standards of achievement, remained unbroken for many years after his passing: therefore, be it hereby

RESOLVED: That the new Municipal Landing Field for the City of Pittsburgh and Allegheny County should be named "Rodgers Field", and further

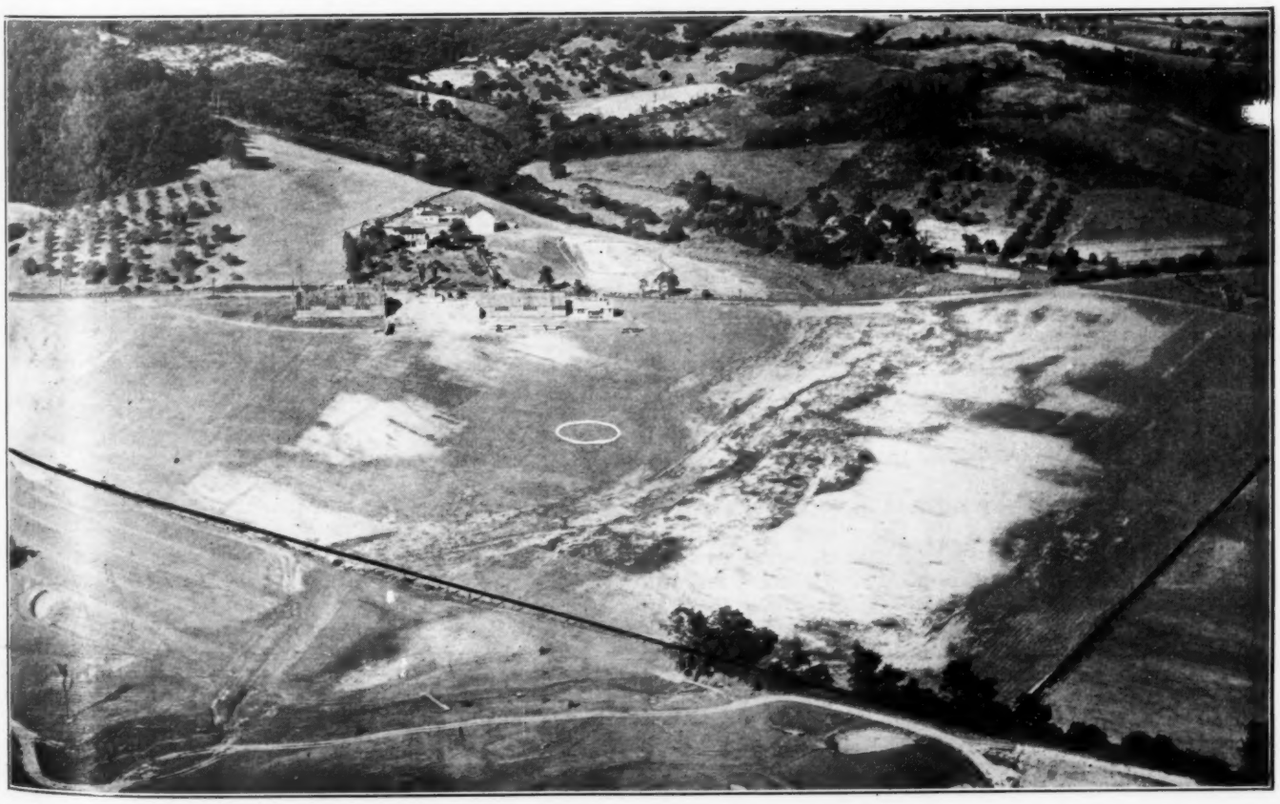
THAT a copy of this resolution be addressed to the Honorable William A. Magee, Mayor of the City of Pittsburgh, and to the Commissioners of Allegheny County, and to the members of the City Council and to the office of the Chief of Air Service, U.S. Army, and the public press.

Following the unveiling, a brief program was carried out, with short addresses by Col. Samuel H. Church, president, Carnegie Institute; Dr. William J. Holland, director emeritus, Carnegie Museum; Mr. Andrey Avinoff, director, Carnegie Museum; Mr. Howard B. Pearce, past president of the Aero Club and Capt. Thomas S. Voss, U.S. Army Air Corps, Air Officer of the 99th Div. and Commanding Officer of Army Reserve Flying at Rodgers Field.

The program was completed by the showing of the latest moving pictures depicting new types of aircraft, showing a comparison with the type used by Rodgers.

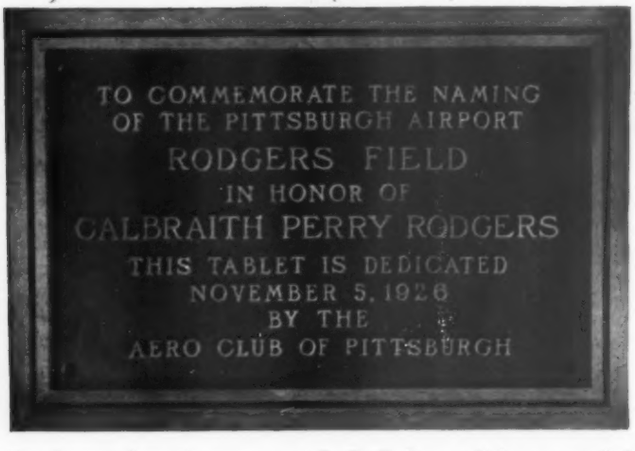
Rodgers was born in Pittsburgh, Pa., in 1878 and was the son of Capt. Calbraith Perry Rodgers of the U.S. Army Cavalry and a member of the well known Naval family of that name. His father was killed by lightning, at the age of thirty, while fighting Indians in the West.

The pioneer aviator was a great-grandson of Commodore Matthew Calbraith Perry who "Opened the Gates of Japan" in 1853. Commodore Oliver Hazard Perry, who distinguished himself in the Battle of Lake Erie during the War of 1812 was a brother of Commodore Matthew C. Perry. Another great-grandfather of his was the famous Commodore John Rodgers. He was a double cousin of the late Commander John Rodgers of the U.S. Navy, who was recently killed in an airplane ac-



An aerial view of Rodgers Field, the airport of Pittsburgh, Pa.

cident near the Philadelphia Navy Yard. Their mothers, who were sisters, married brothers. From boyhood up, these cousins were closely attached to each other and learned to fly together in June 1911, with the assistants of the Wright Brothers in Dayton, Ohio. From the time the Wrights succeeded in making their first flight, Calbraith Rodgers was extremely interested in airplanes. In less than a month after learning to fly, he won the duration prize of $10,000 at the Chicago International Aviation Meet, remaining in the air 22 hrs.



The bronze plaque in memory of C. P. Rodgers, which was unveiled recently in the Carnegie Museum of Pittsburgh.

After other numerous flights he then decided to attempt the Atlantic to Pacific Flight and on Sept. 17, 1911 he left Sheepshead Bay, L. I. in a new E-X model Wright Bi-Plane, and landed safely at Long Beach, California on Nov. 5, 1911, with both legs in plaster casts. He flew 4,321 mi. over a route, which embraced Chicago, Kansas City, Dallas, San Antonio, El Paso, and Phoenix, and his actual flying time was recorded as 3 days, 10 hr. and 4 min. Total elapsed time from start to finish was 49 days, with 69 landings. In the flight 1230 gallons of gasoline were consumed, 18 wings were used, and after starting with two engines, it finished with one made up from parts of two. The only parts of the original machine to reach the coast were the rudder and two stanchions, and to one of these stanchions a small bottle of Vin Fiz was wired, having passed through all accident without breaking.

A special express car accompanied him the entire trip carrying extra parts, in case of accident.

After completing this record flight, he immediately returned by train to New York City and was tendered a dinner by the Aero Club of America at which he was given a medal, presented personally by President Taft.

A few weeks later he returned to California, and during an exhibition flight over Long Beach, was killed on Apr. 3, 1912, by crashing into shallow water. It is a marked coincidence that these double cousins, Calbraith Perry Rodgers and Commander John Rodgers, both met death under somewhat similar circumstances.

It is for this record that the Aero Club of Pittsburgh honors Calbraith Perry Rodgers and by it he has in turn honored Pittsburgh and the history of aeronautics.

How Many Civil Airplanes Are Operating?

The Aeronautic Branch of the Department of Commerce has been conducting a survey to determine how many civil airplanes there are in the country. It is estimated that this number reaches between 3,500 and 5,000. Following the War, the Army and Navy disposed of 1,511 planes to private individuals and concerns, in addition to selling separate parts and accessories which would build 500 additional planes. A total of 12,916 airplane engines were sold. If, for every six operating planes, there might be considered four engines on the ground, the estimate of civilian owned airplanes in existence would run up to 3,229.

It will be some time before the Department of Commerce will have completed this survey and the information gained will be of material interest.

Artificial Helium

Two German chemists, Dr. Paneth and Dr. Peters, recently announced that they had succeeded in manufacturing artificial helium. Their method renders the transformation of hydrogen into helium possible.

So far the German scientists have produced only infinitesmal quantities of helium, without practical value. In course of time, however, the discovery may attain considerable practical significance. Helium is one of the precious gases, extremely rare upon our planet and particularly valuable for filling dirigibles. Since this gas will not burn, its use guarantees protection against the danger of explosion and fire in the air. America is in the fortunate position of owning the best sources of helium in the world and has used the gas in her larger airships.

Government Offers Liberty Engines

New Liberty engines of 400 hp., are for sale for $2,000 each, the Department of War announced on Nov. 12. The engines may be used only on airplanes to be flown within the United States.

The full text of the announcement follows:

The Chief of Air Corps has for sale a number of Liberty airplane engines. The engines can be sold only for flying purposes within the territorial limits of the United States.

These are new Liberty engines, 12 cylinders, 400 hp., and are in storage at Little Rock Air Intermediate Depot, Little Rock, Ark.

The price f.o.b. cars or trucks at Little Rock is $2,000. each, plus a handling charge of $10.

Further information may be obtained from Chief, Material Division, Air Corps, McCook Field, Dayton, Ohio.

Waldo D. Waterman Tours Industry

Waldo D. Waterman, former president of the Professional Pilots Association, in a recent tour of the aircraft industry, visited the principal air transport companies of the country, and with the exception of the Florida Airways, Atlanta-Miami, the Varney Aircraft Co., Elko-Pasco, and the Pacific Air Transport, Los Angeles-Seattle, was a passenger on every contract air mail line. Mr. Waterman flew 6610 mi., in 13 types of planes and visited 42 civilian fields, 3 Army fields and 2 Navy fields. During the entire trip his schedule was 72 min. behind time and 141 min. ahead. He was a passenger on 10 scheduled airlines and inspected 15 different aircraft factories.

Mr. Waterman reports nation-wide activity in the aircraft industry, and is much impressed with the expansion that has taken place over a short space of time.

Arkansas Aircraft Co. Starts Production

With the addition to its staff of H. Morton Clark, of New York City, well-known aeronautical engineer, the Arkansas Aircraft Company, of Little Rock, Ark., announces that production of airplanes will begin about Dec. 1, under Mr. Clark's charge.

The company will manufacture a light, three-passenger plane and the first is expected to be turned out ninety days after production starts.

In addition to manufacturing planes, the company will operate a general aviation service and maintain an aviation school. Plans of the company call for establishment next spring of a crop-dusting service.

J. Carroll Cone is president of the company, H. L. Remmel, vice-president, W. F. Moody, secretary and Maj. Henry Fredeman, treasurer. Moorhead Wright and Roy L. Thompson are members of the board of directors together with the officers.

The local Chamber of Commerce and the Little Rock chapter of the National Aeronautical Association materially assisted in the founding of this company. It will use the local airport as a landing field, the airplane factory being located a short distance from the field.

THE

ADVANCE AIRCRAFT CO.

LARGEST PRODUCERS OF COMMERCIAL AIRCRAFT IN AMERICA ANNOUNCE

PRICE REDUCTION

ON THE IMPROVED

WACO-9

THREE-SEATER

$2250.

AT TROY, OHIO

More WACO'S are now in service for profit and pleasure than all other planes now in production in America.

THE PERFORMANCE MADE THE DEMAND

Write for Details

THE ADVANCE AIRCRAFT COMPANY

TROY, OHIO

The Lizette Sport Plane

A New Low Powered Two-Seater Plane for Sport Touring.

A GREAT many people visiting the National Air Races recently were interested in a new type of airplane which was displayed at that time in the Transportation Building at the Sesqui-Centennial Exposition. This machine, known as the Lizette, was designed by Roy. G. Miller and Dayton T. Brown and was built by the Ludington Company of Philadelphia.

The Lizette is a parasol monoplane with semi-internally braced wings. It was designed with the idea that satisfactory performance could be obtained in a two-seater with a thirty-five horsepower engine if sufficient attention was devoted to detail. The desired result has been obtained by reducing to a minimum the number of parts exposed to the windstream and by the employment of streamline shapes. Strut terminals were designed which leave the streamline form uninterrupted.

Wings

The wings are of more or less conventional wood construction with spruce box beams and Fokker type ribs. Double drag bracing is used, one set in line with the upper and one with the lower beam flange. This provides extreme rigidity against torsional deflection. The lift-struts are streamline duralumin tubes. The wing section is a deep high lift airfoil at the center, tapering to a thin high speed airfoil at the tips.

Ailerons

The plan form of the wing tip and aileron conform to practice which wind tunnel tests indicate to be most efficient. The incidence is washed out at the tip to improve the control at slow speed. The profile of the aileron is so designed that the contour is uninterrupted for "down-aileron" but a toe protrudes to increase the drag for "up-aileron". This feature was designed to improve the control in making a turn by increasing the drag of the wing tip on the inside of the turn. Flight tests have shown that the ailerons are extremely efficient as regards both roll and yaw.

Fuselage

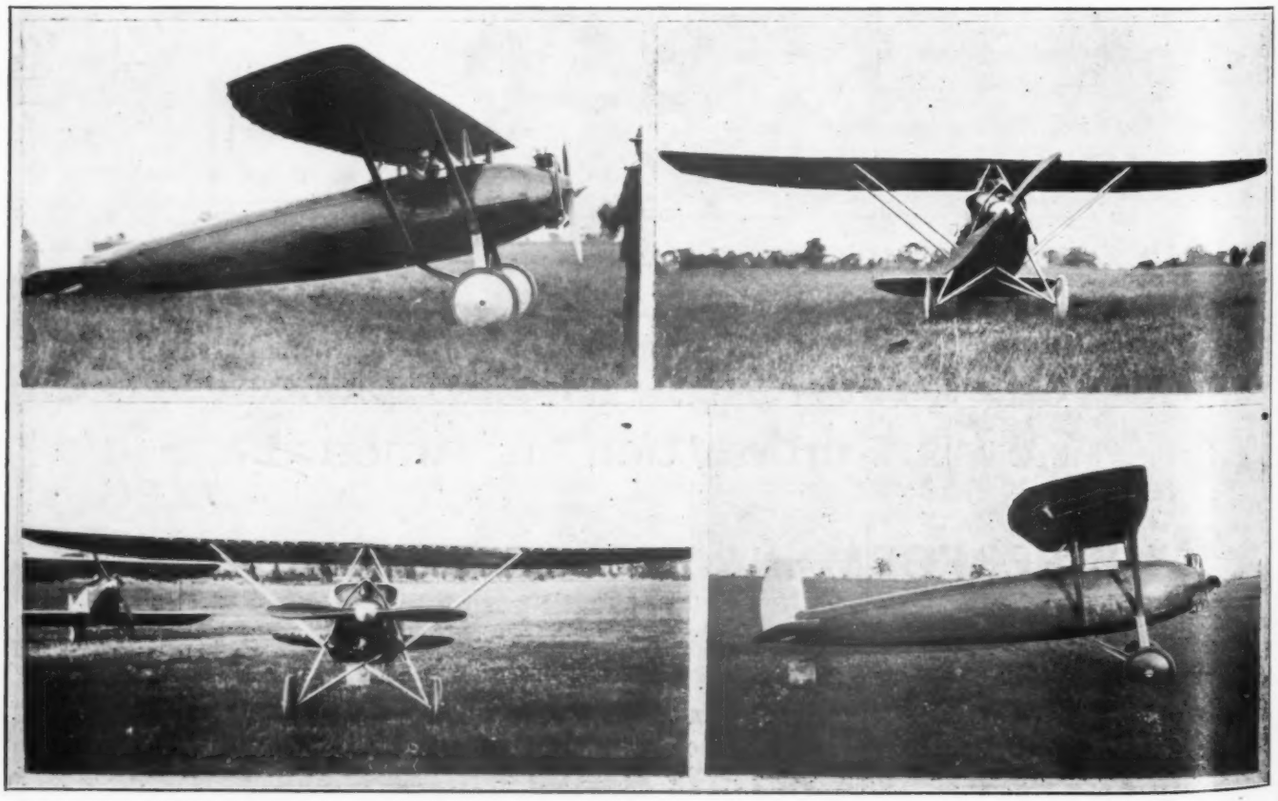
The fuselage is of duralumin monocoque construction with a streamline form. The duralumin sheets are built on one piece annular frames which have sufficient stiffness to eliminate the necessity of bulkhead bracing. The result is that the interior of the fuselage is entirely clear. The seating arrangement is side by side with a heavy reinforcement carried around the cockpit openings to insure against crash hazzard. A door on each side provides an easy entrance with a small cockpit opening.

The elimination of fabric covering greatly improves the appearance and the streamline effect besides providing a sturdy construction which will stand considerable rough handling.

Tail Surfaces

It has been somewhat of a problem in airplane design to combine stability with effective control. Any increase in movable surface at the expense of the fixed surface improves the control but impairs the stability. On the other hand, a relatively large fixed surface produces good stability characteristics but has the effect of blanketing the control surface.

On the Lizette both the vertical and the horizontal tail surfaces are designed to combine good control with stability. Each surface is an airfoil section with a stationary center of pressure and it is pivoted slightly forward of the center of pressure location. The full surface area is available for control and is free of any blanketing effect. It is possible to hold the surface in neutral by a spring which can barely be felt at the control stick. The stability characteristics are

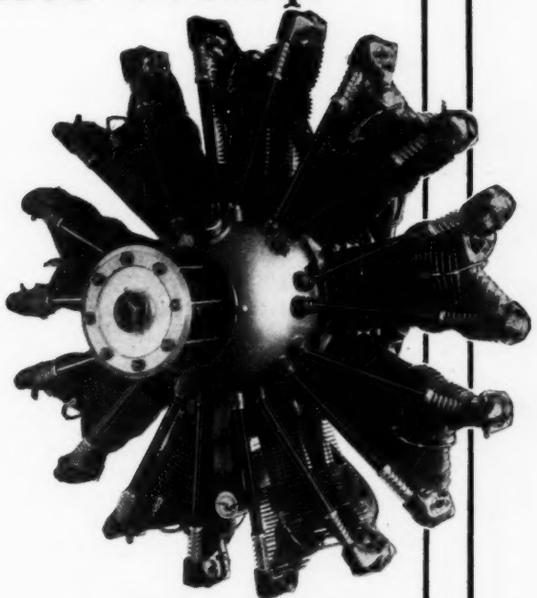


A selection of views of the Lizette sport plane (Anzani, 35 hp.)

The Home of the "Wasp"

These splendid facilities stand squarely behind the production of "Wasp" engines. Situated in the very center of the finest manufacturing district of New England, there is assured the skilled workmanship so essential for this work.

Into every engine is built the qualities which make for the fine performance and dependability so vital in both military and commercial flying.



425 H.P. at 1900 R.P.M.
Weight 650 lbs.

THE
PRATT & WHITNEY AIRCRAFT CO.
HARTFORD CONNECTICUT

LANDING FACILITIES MUNICIPAL FIELD AND CONNECTICUT RIVER ON AIRWAYS MAPS

similar to those of a conventional tail group with locked controls. The same effect as an adjustable stabilizer is obtained by adjusting the neutral position. Aside from the function of adjusting the trim, this neutralizing adjustment offers an emergency control in case of failure in the stick control system. The downward motion of the elevators is limited, so that the angle cannot exceed the burble point of the airfoil employed.

Landing Gear

The landing gear is of the split-axle type. The wheels turn on alloy steel round tubes which are riveted into the ends of the streamline duralumin tubes. The shock absorbers employ streamline compression pads enclosed inside of 1½ in. streamline telescoping tubes. The pads are held in initial compression to eliminate "softness" in taxiing and to insure that a maximum amount of shock be absorbed with a short displacement. A considerable amount of friction is introduced to prevent rebound.

Performances

The actually verified items of performance show very close agreement with the calculated performance. The speed has been measured by six trips (three each way) over a measured course. The climb was measured by means of an altimeter and stop watch and represents an average rather than this initial rate. The initial rate would be slightly better than this average. The following table shows an interesting comparison with the war-time Jenny, carrying the same number of persons.

	LIZETTE		*JN4D*
	Calculated	*Actual*	
Power (Anzani)	35 hp.	35 hp.	90 hp.
Weight	840 lb.	840 lb.	2016 lb.
Wing area	120 sq. ft.	120 sq. ft.	352 sq. ft.
Span	27 ft.	27 ft.	43.6 ft.
Surface loading	7 lb./sq. ft.	7 lb./sq. ft.	5.7 lb./sq. ft
Power loading	24 lb./hp.	24 lb./hp.	22.4 lb./hp.
High speed	91 m.p.h.	91.5 m.p.h.	73 m.p.h.
Low speed	42 m.p.h.	—.	41 m.p.h.
Climb, with pilot alone	550 ft./min.	575 ft./min.	—.
Climb, with pilot and passenger	440 ft./min.	450 ft./min.	335 ft./min.
Mileage per gal. full speed	28 miles	—	8 miles
Mileage per gal. 65 m.p.h.	38 miles	—	10 miles

Kentucky Company Builds New Plane

The Kentucky Airplane Company of Owensboro, Ky., has recently completed service tests on an experimental plane which has been under development for two years.

The company plans to place two models of this machine on the market in the Spring. With this end in view, suitable jigs have been constructed and plans have been completed for shops at the field which will give the company a total floor space of 16,500 sq. ft.

The Kentucky Airport is at all times available to visiting pilots. It is located two miles directly East of Owensboro. Hangar space, gasoline, oil, water and repairs are obtainable at all times.

Dinner in Honor of Sir Alan J. Cobham

Sir Alan J. Cobham, the English aviator, who recently flew to Australia and return, a distance of 26,000 miles, will be the guest of honor at a banquet to be given by the Aeronautical Chamber of Commerce in the grand ballroom of the Waldorf Astoria Hotel Monday evening, Nov. 29, according to an announcement made by the Chamber recently. Sir Alan arrived in this country on the Homeric on Nov. 24.

Covers will be laid for 500 guests. Among those who have already accepted invitations are W. P. MacCracken, Assistant Secretary of Commerce in charge of aviation; F. Trubee Davison, Assistant Secretary of War for Aviation; E. P. Warner, Assistant Secretary of Navy for Aeronautics; Rear Admiral Moffet, Chief of the Bureau of Aeronautics and General Mason M. Patrick, Chief of the Air Corps.

The toastmaster will be Col. Paul Henderson, President of the Chamber and general manager of the National Air Transport Corporation.

The banquet will be attended by a large number of persons interested in aviation and many distinguished in official and civic life of the city and Nation.

Opening of Guggenheim Aeronautics School

The new building to house the Daniel Guggenheim School of Aeronautics, New York University, was officially opened on Oct. 27. The ceremonies were attended by Gen. John J. Carty; Hon. F. Trubee Davison; Harry F. Guggenheim; Earl D. Osborn; Dr. W. F. Durand; Dr. Elmer E. Brown and R. J. Gibbons.

Wide World Photo

Among those who were shown around the new building of the Guggenheim School of Aeronautics by Prof. Alexander Klemin were (see above, left to right) Gen. John J. Earty; Hon. F. Trubee Davison; Harry F. Guggenheim, president of the Daniel Guggenheim Fund for the Promotion of Aeronautics; Earl D. Osborn, of AVIATION; *Dr. F. W. Durand, president of Leland Stanford University, Cal.; Dr. Elmer E. Brown, chancellor of N. Y. University.*

The Hon. F. Trubee Davison, Asst. Sec. of War for Aviation reviewed the Air Unit of the University which now consists of 127 men. These men are drawn mostly from the College of Engineering, although some of the men belong to the College of Arts and Sciences of the University. This unit drills during the Winter and studies military aeronautics. During the Summer, the Government will give those members who desire it, actual flight training. All those who are taking the aeronautical engineering course are particularly encouraged to join the Air Unit the work of which, particularly with the flying in the Summer vacation, compliments very usefully their engineering studies.

After the review of the Air Unit the Assistant Secretary and the other members of the Committee of the Guggenheim School of Aeronautics visited the new building. This is nearly complete and classes are already being held in it. The wind tunnel is not yet completed and when this is done a full description of the building will be given in AVIATION. The enrollment in the School of Aeronautics has now reached fifty-seven, distributed as follows: Freshmen, 21; Sophomores, 13; Juniors, 5; Seniors, 4; Graduate, 4; Specials, 10.

The new Aeronautics building of the Guggenheim School of Aeronautics, N. Y. University.

Travel Air Mfg. Co. is indebted to Mr. P. T. Wilson, of Somerville, Mass., for his kind, unsolicited letter printed below.

Thank you, Mr. Wilson -

Somerville, Mass.,
November 2, 1926.

Travel Air Mfg. Co.
Wichita, Kansas.

Dear Sirs:—

I have recently flown from Los Angeles to Boston in an OX5 Travel Air. I wish to commend you upon the fine performance of the Travel Air. We flew 3325 miles and had no trouble. Our flying time was 44 hours. The gas consumption was 7.5 gal. per hr.

We got out of a very wet field at Lordsburg, N.M. (elev. 4500 ft.) without difficulty. Many OX5 jobs have cracked up at Lordsburg even when the field is dry and I recall a few cases where larger planes have found it hard to get out.

We were caught in a 100 mile line squall about 100 miles north of Dallas and the plane acted very stable. Again, we met rain and lightning between Cincinnati and Dayton and the plane performed remarkably.

I would recommend the Travel Air to anyone who desires a plane for transcontinental flying where all kinds of fields and air are met. It performs equally well in the north and south and the east and west. We were flying below sea level over the Salton Sea and cleared the southern end of the Rockies without danger.

You are at liberty to use the above testimonial or any part of it as you desire, for publication or otherwise.

Very truly yours,
(Signed) Paul Theodore Wilson,
Mass. Inst. of Tech. 27.

The experience of others is your surest guide in the selection of YOUR airplane.

Travel Air Mfg. Co., Wichita, Kan.

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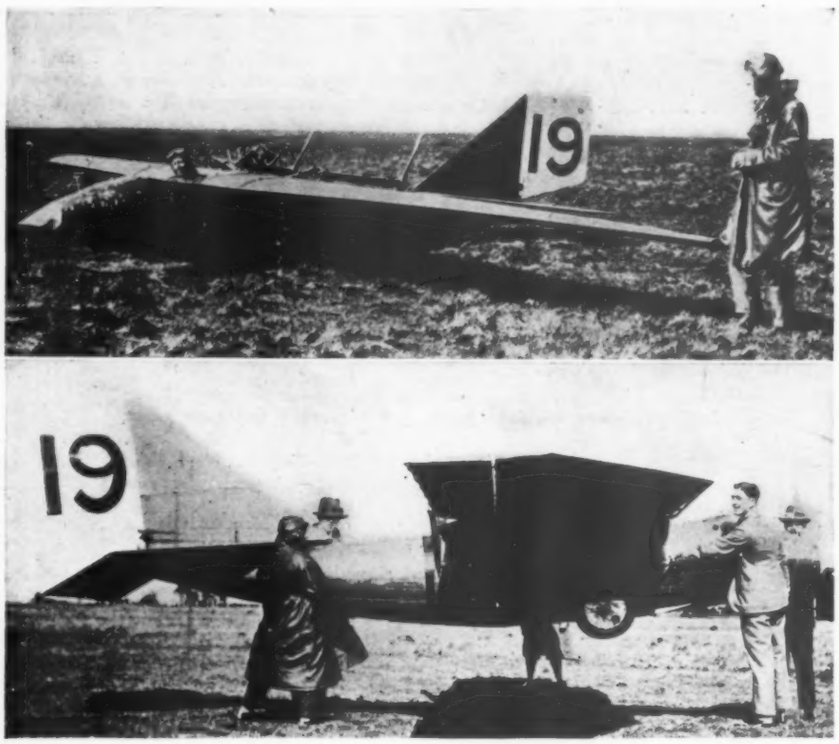
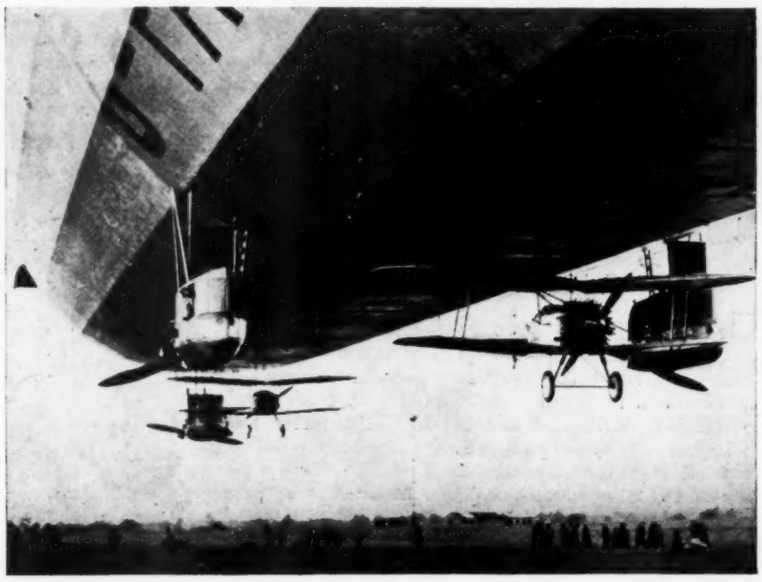


VERY LOW POWERED FLYING. Two views of the Gnospelius Gull single-seater lightplane which has made some short flights in the North of England. The machine is equipped with a Blackburn engine developing 5-6 hp. which drives two propellers through a system of chain drives.

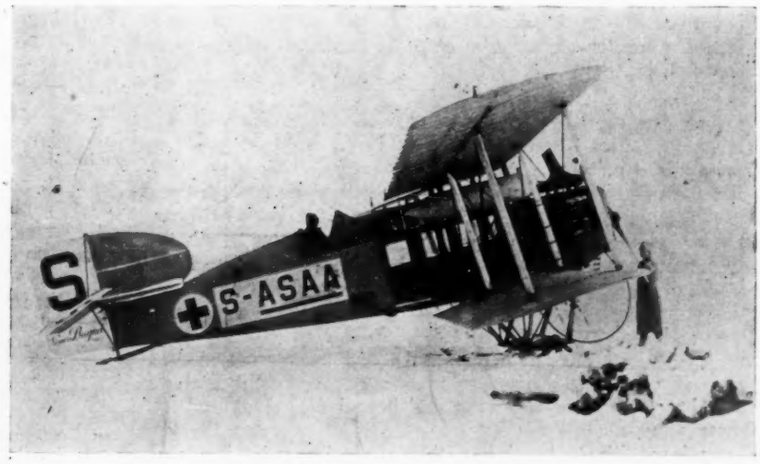
(Right) PARACHUTING AMONG THE MOUNTAINS. Sgt. Archie B. Atherton, U.S.M.C., of North Island, San Diego, Cal., recently made one of the most hazardous parachute jumps ever attempted, making a perfect landing in the famous Yosemite National Park, Cal., among the 5000 ft. cliffs of Half Dome, 11 Capitan and Glacier Points.

MARKING THE AIRWAYS. What Atlanta, Ga. is doing to mark the airways of the country. The Palmer Building, with the name of the city marked clearly on the roof and an arrow pointing due North. This marker was installed by the owners of the building and not by the city authorities.

LEAVING PORT. The U.S.S. Los Angeles leaving the Ford mooring mast at Detroit, Mich., during the recent round trip flight from Lakehurst, N. J.



(Above) FUTURE AIRCRAFT CARRIERS. Recently, the British rigid airship R-33 made a flight carrying two Gloster Grebe (Armstrong-Siddeley Jaguar, 385 hp.) single-seater fighters of the R.A.F. suspended below her hull. During the flight, both planes were successfully flown away, their engines being started by means of gas starters in the hull of the ship. Each plane was suspended by means of a quick release suspension at the center section and struts to each wing tip and one to the middle of the back of the fuselage to prevent oscillation. It will be recalled that, on previous occasions, only low powered planes have been launched from airships.



THE RED CROSS OF THE AIR. Above, a Swedish Red Cross plane operating in the wilds of Lapland and, on the left, a DH-4 ambulance in use by the U.S. Navy.

Side Slips

By ROBERT R. OSBORN

As we were unable to be present at the Schneider Cup Races at Norfolk, for a number of reasons, the reasons being mostly of a financial nature, the following comments from Mr. N. V. C. are very welcome:

Several of the spectators went from New York to Norfolk, via boat. Rough weather soon began putting them through their own private "navigability trials," and it is said that by dinner time all but two had been forced down because of fuel system trouble.

While the race was undergoing its usual postponement, the spectators spent their time in singing hymns—"On the Gin-Gin-Ginny Shore" being the most popular number.

The race was truly an international one, the participants being Italians, Americans and Scotch. The latter was said to be by far the most powerful.

We're all in favor of assigning Norfolk as the permanent location of the Schneider Race. The facilities were perfect—course, hangars, spectators' space, etc. It was an even better place for holding a seaplane race than Model Farms Field in Philadelphia! And everything was free—parking space, banquets—we were even permitted to look at the airplanes before the race. And the Norfolk members of the fair sex—well, one of the most prominent of the civilian pilots is not home yet.

"Isn't this heartbreaking?" said our old friend, The Intrepid Aviator, after the race, "Now we'll have to get a gondola and go to Italy with nothing but champagne and Chianti to drink during the week that the races are postponed."—N.V.C.

* * * *

The American fliers apparently had not fully appreciated the hazards of the race until they saw the victorious Italian flier being kissed by his mechanics and brother officers. It seems that rustless steel helmets will have to be standard equipment in all American entries for the next Schneider Cup Race, unless the present attempt to revive hand-kissing is successful.

* * * *

It's time for the Society for the Aeronautical Education of Artists to hold another meeting, as conditions with which the society is concerned are getting in terrible shape again. The illustrator of a recent story in the Saturday Evening Post used one of the more popular types of present-day commercial planes as a model for a "Two-seater combat plane***could not be equalled in Europe or America for speed, climb and maneuverability. ***** four hundred and fifty horse power." That is, the fuselage complete with its OX engine looks to have been taken from that commercial plane. The wings have two bays with one back strut missing, no lift or landing wires, also boasting non-skid struts and wire bracing on the top wing and bowed skid strut under the lower wing.

A prominent illustrator in another magazine, who is also noted as a war flier, shows a giant bomber coming down in flames with all of the flames and smoke streaming forward.

The meeting to consider these charges will be called to order as soon as we can get some one else to join the society of which we are the founder and president.

* * * *

Pictures and illustrations of an aeronautical nature are really improving, we are glad to say, and the corrections which are pointed out above are relatively unimportant. It wasn't so long ago that even our aeronautical magazines printed advertisements and articles illustrated by planes in "full flight" with cockpits empty, sometimes with chocks under the wheels, and, when ailerons were rigged loosely, with both of the ailerons hanging straight down. At least this much improvement has been made.

The announcement that it will be possible to substitute coal for gasoline in motor vehicles and airplanes in the near future, brings up something else which must be taken into account in our new air laws. Having seen many a fifty pound chunk of coal thrown off locomotives because they were hard to break up, we think that "Rice" or "Pea" sizes should be the largest permitted in airplanes and that the pilots should not be permitted to shake down the grates or remove clinkers over cities of 2500 or more.

De Bernardi Sets New Speed Record

Major Mario de Bernardi, winner of the Schneider Cup Race, added further to his record when, on Nov. 17, he piloted his Macchi-Fiat monoplane over a straight-away three-kilometer course at the average speed for four laps of 258.-873 m.p.h. This is a new World seaplane record, exceeding last year's record of Lieut. James H. Doolittle of the U.S. Air Corps by more than 13 m.p.h. The land plane record, which is held by Adjutant Bonnet, of France, is 278.48 m.p.h.

The test, which was made at Willoughby Spit, Norfolk, Va., was timed by the same devices and officials who acted in the Schneider Race. Major de Bernardi's best speed was 272.132 m.p.h. with the wind, and his slowest 243.232 m.p.h. against the wind.

As in the Schneider Cup race, Major de Bernardi's plane was equipped with a Reed metal propeller, and it is interesting to note that, due to a minor defect, the engine was not turning up to its full capacity by 100 r.p.m. at the time the new record was made.

'Naval Air Pilot' Made Public

In keeping with the policy of the Navy Department to assist to the utmost, the development of commercial aviation in this country, it has recently been announced that the "Naval Air Pilot," an official publication formerly available only within the Service, is being made public and available to commercial operators and fliers. Copies of the publication may be obtained from the Hydrographic Office, Washington, D. C. at very nominal prices, namely, Part 1 at 20 cents, and single sections of Part 2, each one of which refers to an individual state, at 10 cents.

Part 1 of the Naval Air Pilot consists of general information that may be of value to commercial as well as military and naval pilots. The portion offered for sale consists of the following chapters: 5—Weather reports and information; 6—Storm Warnings; 7—Coast Guard Stations; 8—Naval Air Stations and Air Service Flying Fields; 11—Places of restricted flying; 13—Distress signals for aircraft.

Part 2, issued in sections, each section covering a state or foreign country, contains specific and local information concerning routes, seaplane anchorages, landing fields, etc. The sections covering the following states have been published and are ready for sale: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina.

The Naval Air Pilot will be corrected and supplemented from time to time, whenever necessary, by the Notice to Aviators, a monthly pamphlet issued by the Hydrographic Office.

The Notice to Aviators is distributed free to pilots and others who send in to the Hydrographic Office information of value in much the same manner as is the Notice to Mariners. Purchasers of Part 1 and sections of Part 2 covering either the entire Atlantic or Pacific coast of the United States, will, if they so request, be placed on the mailing list to receive Notices to Aviators, for a period of one year, which time will be extended indefinitely if they co-operate with the Hydrographic Office in the securing of necessary information. In this manner, as the Notices to Aviators is the means used to add to, correct and amend the Naval Air Pilot, purchasers of that publication can insure its being correct and up to date.

In order to incorporate in the Naval Air Pilot complete information for the use of the flier, it has become necessary to include certain aeronautical bulletins published by the Air Service, United States Army. These publications may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents a copy, and a list of them will be sent upon application.

AIRPORTS AND AIRWAYS

Philadelphia's Air Activities

By Hollinshead N. Taylor

Philadelphia has gone to the forefront in the last year in aerial activities. A municipal landing field or airport is located close to the Model Farms in the southwestern section of the city at Penrose Ferry and Island Roads, and is now in active use. Hangars have been constructed on that field for the use of the National Guard and also for civilian fliers. The planes of the Ludington Exhibition Co. operate regularly from this field and this company has also furnished a flood lighting system to provide the necessary illumination for night flying from the field.

Just across the river at the League Island Navy Yard is the Naval Aircraft Factory and Mustin Field, the new Navy airport formally opened a few weeks ago. This field is used as the Philadelphia terminus for the Washington-Norfolk service of the Philadelphia Rapid Transit Co., the first regularly established commercial passenger carrying line to be operated in this vicinity. Further up the Delaware River, at Bristol, is located the large plant of the Huff-Daland Co., actively engaged in the manufacture of airplanes on a large scale for the Government and for commercial use, making a specialty of machines for dusting cotton fields. This company has recently completed what is claimed to be the largest single-engine airplane ever constructed. This plane, known as the Cyclops, is a bombing machine made for the Air Corps. It is driven by an 800 hp. Packard engine and will carry a 4000 lb. bomb and a crew of six men.

The largest active commercial flying organization in the Philadelphia district is the Pitcairn Aviation Company, operating from one of the largest commercial flying fields in this country, located at Horsham, a short distance beyond Willow Grove on the Doylestown Pike. Both this concern and the Ludington Exhibition Co. at the City Field provide facilities for short flights or "hops" and this service is largely patronized, especially on holidays, by those who desire the experience of a short flight. These concerns also furnish an aerial taxi service for the convenience of those who desire to make more extended trips. Many times they have been called upon in those cases of urgency where the saving of time was all important, this form of travel, requiring about one-third to one-quarter the time required by rail. Should you desire to own and operate your own plane, instruction is given by those concerns in the operation of land planes. Should you prefer to operate a seaplane, you will find facilities for instruction under the expert tutelage of Frank Mills at Essington, Pa. Should you desire air views of your country place or manufacturing plant, these can be furnished by Victor Dallin and also the Aero Service Corp. Philadelphians are familiar with the excellent work of these concerns from the air photographs frequently shown in the illustrated sections of our daily newspapers. Another Philadelphia concern known widely throughout the industry for its pioneer work in air surveys and photography is the Brock & Weymouth Co. which has developed some very novel

DE BERNARDI USED A REED PROPELLER

on the Italian Macchi-Fiat Seaplane with which he won the *Schneider Cup* of 1926 and Set the World's 3 Kilometer Seaplane Record.

All the other planes which finished in this race also had Reed Propellers.

Reed Propellers are now being manufactured under license as follows:

UNITED STATES, Curtiss Airplane and Motor Co., Inc., Curtiss-Reed Propeller.
GREAT BRITAIN, Fairey Aviation Co. Ltd., Fairey-Reed Propeller.
FRANCE, P. Levasseur, Levasseur-Reed Propeller.
ITALY, Societa Italiana Caproni, Caproni-Reed Propeller.
GERMANY, Metallbank, Aeron-Reed Propeller.
JAPAN, Mitsubishi Co.

These propellers are made from forged or rolled aluminum alloys of the duralumin type and over 1500 are now in service.

The following are the most important of numerous world records: World's speed record 1923, Mitchel Field, L. I. World's speed record 1924, Istres, France. Pulitzer and Schneider Cup winners 1923-1925. Schneider Cup winner 1926, World's Speed record for Seaplanes 1926, Norfolk, Va. President's Cup, Prague 1925. Beaumont Cup, Istres, France, 1925. First flight to North Pole, Byrd 1926. Belgium-Congo (Medaets) 1926. King's Cup, England 1926. German Seaplane Competition, 1926. Cobham, London-Australia 1926. (Australian portion of flight).

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and interesting instruments for topographical surveys from the air.

During the course of the Sesqui-Centennial Exposition, daily exhibitions of flying were conducted by the Composite Squadron consisting of pursuit planes, bombers, etc. stationed on the Exposition Grounds under the command of Maj. J. C. McDonnell. Airplane possenger carrying flights were also provided during the course of the Exposition by Pitcairn Aviation operating from a field directly adjoining the western border of the Sesqui Grounds. Director of Public Safety Elliott is considering favorably the establishment of an air police force, to be available for duty as may be necessary, especially during large open air gatherings, to prevent foolhardy operation of aircraft over crowds of people. No particular hazard is involved in ordinary flying at a safe elevation over large assemblages of people, but provisions should be made to prevent acrobatic stunting and flying at a dangerously low elevation over large assemblages of people. From the standpoint of safety there is as much difference between stunting and conservative flying as between automobile racing and ordinary touring.

Chicago, Ill.

By Otto Klein

The new association, whose organization was announced in a previous issue, has by popular vote been named just plain "Aircraft Association", this name being short and to the point and including every branch of aeronautics. It was suggested by some to limit the membership to only those who are actually making their living in aviation, but as the membership would thus be very limited, as indicated by loud and stormy protests from all corners of the house, it was decided to limit the membership to all those who are trying to make a living in aviation. The membership list immediately increased by leaps and bounds.

The association made its debut by staging an air meet at the Checkerboard Field on Armistice Day. The weather was fair, and, while there were not very many planes present, those that took part gave a very good show. J. D. Barchard's and Art Chester's beautiful new Swallows gave a great stunting exhibition. Tony Yackey was there with his new Ryan monoplane, staging exhibitions and taking part in all other events. It certainly is a beautiful plane and gives a remarkable performance.

Jack Cope put on a wing walking and rope ladder act and ended the day in a parachute jump that landed him directly in front of the spectators.

Passengers were carried during the afternoon at five dollars a trip, part of which was turned over to the association, in order to keep the treasurer busy and to pay for the police escort provided to accompany the "huge" proceeds to the bank. As the treasurer has not been bonded as yet, we are anxiously awaiting a report of his disposition of all the money.

Holyoke, Mass.

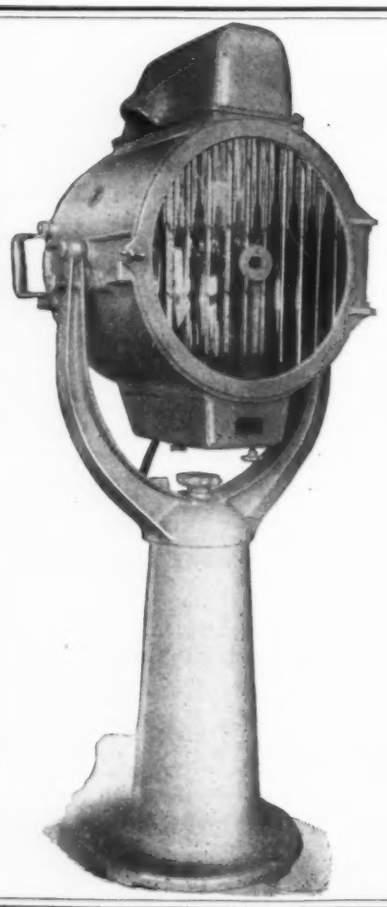
By Sergeant Harry J. Jenkins

Lieut. Winthrop O. Sargent, local commercial flier, suspended operations for the winter during the recent cold snap. He is considering starting a flying school here next season. With students and the number of passengers he usually carries to Mount Tom and Northampton, President Coolidge's home city, he should do a rushing business. Many of his passengers are local Smith College girls, who are very keen about flying.

The Springfield, Mass., Chamber of Commerce, is slowly arranging for the establishing of a Springfield airport.

Theodore A. Hodgdon, a resident of Springfield, it is understood, is planning to flight-test a light plane of his own design next spring. It may be recalled that Hodgdon was one of the designers who helped produce the Kimball-Ford motored biplane which was flown successfully at Groah Field, Saugus, Mass., in 1918, but which was never placed on the market.

The Spencer light plane recently sold to a party at Hartford, Conn., was washed out when a high wind caused the



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little monoplane to attempt an uncontrolled flight. It was carried through the air nearly 80 ft., and then dashed to the ground a crumpled wreck.

McKeesport, Pa.

Bettis Field, named in honor of the late Cyrus K. Bettis, was impressively dedicated Nov. 13. William P. MacCracken, Jr., Assistant Secretary of Commerce for Aeronautics, and Congressman Clyde Kelly took leading parts in the program. J. W. Simpson, of Dravosburg, acted as master of ceremonies. Other speakers were Maj. T. J. Lanphier, commanding officer of the First Pursuit Squadron, of Selfridge Field, and Col. H. C. Frey, chairman of the aviation committee of the Pittsburgh Chamber of Commerce and Postmaster George Gosser, of Pittsburgh, also delivered addresses. Miss Ithrene Bettis, of Detroit, sister of the pilot, was present at the ceremonies.

The regular program began at 1 p.m. when Air Corps planes from practically every principal field in the country maneuvered in battle formation and indulged in stunt flying and other feats. At 2 p.m. the field was formally dedicated. The speakers eulogized Cyrus K. Bettis and stressed the great value of his life to aviation.

Following the dedication ceremonies Major Lanphier took to the air, closely followed by five of the squadron of nine planes, which assumed battle formation and gave exhibitions for an hour. Parachute jumps were made from a plane from Chanute Field, and a feature of the day was the broadcasting of a program over WCAE, from one of the moving planes by T. C. McMahon, chief of the technical data branch of the U. S. Army Air Corps.

A party of ten, including four city officials of Detroit arrived at the airport just before the opening of the program. They all commended McKeesport for its vision in establishing the airport.

Fliers, honor guests and residents of the city were guests of the chamber of commerce at a banquet held in the Penn-McKee Hotel during the evening. The function was attended by 250 people. Assistant Secretary MacCracken in an address urged the whole-hearted support of citizens in behalf of the airport. He said that the airport was a necessity both from a commercial and a military standpoint. He urged every man and women to use the air mail at all times to insure the success of Bettis Field as an air mail and commercial port.

The day following the dedication ceremonies 15,000 people saw the aerial pageant which concluded the program. Noted commercial and military pilots vied with each other in thrilling the great crowd that spread over the field and the adjoining hills.

Schenectady, N. Y.

Delivering a consignment of furniture by air was the task that Victor A. Rickard was recently called upon to perform when a local furniture store found that its customer wanted the goods rushed.

The furniture was taken to the landing field on Amsterdam Road, placed in the plane and within 20 minutes the goods were at the door of the purchasers, in Cobleskill, 33 miles distant.

Detroit, Mich.

Capt. Bill Dunn and Noble D. Travis, of the Hess Aircraft Company, are scheduled to leave, in one of their commercial planes, the week of Nov. 22, on a tour, which will include the principal cities of Michigan. Stops will be made at Battle Creek, Kalamazoo, Grand Rapids, Flint, Muskegon, Manistee, Traverse City, Cadillac, Saginaw, Bay City, Port Huron, Lansing, and Hillsdale. The fliers will also visit Toledo, Ohio.

At each of the cities the planes will be met by airport officers. Meetings will be held at the airports to boost aviation and to discuss its problems, development and future possibilities.

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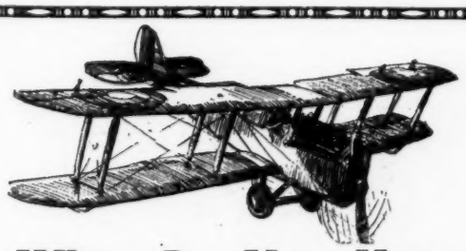

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United States Air Forces

Examination for the Air Corps

The War Department announces an examination to be held from Jan. 17 to 22, inclusive, 1927, for appointment as second lieutenants, Air Corps, Regular Army.

Examinations will be held only within the continental limits of the United States, for the purpose of filling 19 vacancies.

Eligibility to compete in the examination will be confined to qualified fliers who come within the following classification:

(a) Those who have graduated from the Air Corps Primary and Advanced Flying Schools, within the past four years.

(b) Others who satisfactorily demonstrate that they have qualified for flying within the past four years.

By "qualified flier" is meant any individual who fulfills the necessary mental, moral and physical qualifications for appointment as second lieutenant, and who in the opinion of the examining board is qualified to immediately enter into the duties of the Air Corps. This requires ability to fly satisfactorily the type of service airplane in use in any unit to which he might be assigned.

Applications and requests for information should be addressed to the Adjutant General, War Department, Washington, D. C.

Rules for Model Airways

The War Department calls attention to the fact that air navigation maps are now available for all sections of the model airway and instructs pilots to hold their course to the right of the broken red line indicated on maps, maintaining a constant vigilance for other aircraft, particularly during inclement weather when visibility is poor. Passengers, except those in inclosed aircraft, will also be directed to watch for approaching aircraft and signal pilot accordingly.

The model airway consists of the air routes between the following fields: Bolling, Fairfield, Langley, Wilbur Wright, Chanute, Mitchel, Selfridge, Kelly and Brooks.

The commercial air line now operating between Washington, Norfolk and Philadelphia, uses tri-engined monoplanes and carries 10 passengers. It leaves the Naval Aircraft factory daily, following the model airway routes to Washington and Norfolk. These planes keep to the right of indicated course and fly at 1,500 and 2,000 ft. altitude with normal weather conditions.

Aviation Base at Crescent City, Cal.

Crescent City, located on the Northern California coast near the Oregon line, will soon be the scene of intensive naval airplane photographing operations, preparatory to the establishment of a naval aviation base at that point.

The planes and crew comprising the engineering staff of the Pacific battle fleet will leave for Lake Earle, proposed base within a fortnight and will work under the direction of Commander Karl Smith. The mosaic operations will be directed by Lieutenant Ben H. Wyatt, who will take with him the crew he commanded in the mapping expedition of the Alaskan littoral last Summer.

In co-operation with the Navy Department, the War Department has inspected the location with a view of adding such harbor works as may be necessary to facilitate the naval plans and an appropriation of $1,578,750 will be asked of the next Congress to construct harbor works sufficient to handle naval traffic.

Flotation Gear Plane Tests Satisfactory

A test of flotation gear for carrier planes was conducted at the Washington Navy Yard recently. A fuselage of a Boeing pursuit plane was loaded to 2,800 lb., with scrap iron. The flotation gear was installed on the turtleback of the fuselage by representatives of the Airships Incorporated

PRIVATE OPERATORS made the discovery that airplanes engineered to meet the exacting requirements of the **POST OFFICE DEP'T.** were more economical to keep up and operate than many so called, "Commercial Ships."

Considering that the initial cost was no higher, it was well worth their time investigating the superiority of **RYAN M-1.**

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Wyoming and Montana—Wyoming Airways, Casper, Wyo.

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and inflated with a CO-2 before being lowered into the water.

The test was conducted under the supervision of the Bureau of Aeronautics representatives and proved successful in that the fuselage floated with the tail well above the water.

Navy Airplane Carriers Nearly Completed

The airplane carrier Saratoga was 91.4 per cent completed on Nov. 1, and her sister ship, the Lexington, was 86.7 per cent completed, according to the official report of the Bureau of Construction and Repair of the Department of the Navy, which has just been made public. The Saratoga probably will be completed by May 1, 1927, and the Lexington by June 1.

The two light cruisers of the new 10,000-ton class which are now under construction, the Pensacola and the Salt Lake City, are barely begun, while the three fleet submarines and the six river gunboats for use in Chinese waters are in various stages.

Naval Plane Meets Excess Load Test

On Sept. 17 tests were made at the Naval Air Station, Pearl Harbor, T.H., by VT Squadron 19 on the SC-2 torpedo plane to determine the excess load capacity. The tests were conducted by Lieut. M. T. Seligman and Lieut. E. C. Peterson. The plane performed in excellent fashion throughout the tests, particularly in taking off with full load and in climbing characteristics.

The maximum speed reached with a full load of 9,533 lb. was 108 m.p.h. This load is 181 lb. heavier than the required dead load and the speed is 7.9 m.p.h. greater than that on former tests. Such performance in an operating plane not especially overhauled or otherwise repaired for testing purposes is considered remarkable.

The climb to a service ceiling of 5,000 ft. in 39 min., carrying a dead load of 9,533 lb. and a useful load of 3,950 lb. is considered an excellent performance. The remarkably rapid take-off even in a light wind is a feature which makes this plane excellent for torpedo and bombing work in that vicinity.

The instruments used in checking these performances were the regular equipment of the plane and, therefore, cannot be considered as strictly accurate.

Navy Seaplanes in Typhoon

The Aircraft Squadrons, Asiatic Fleet, basing at Zamboanga, P. I., recently made up a recreation party, consisting of several officers and half of the enlisted personnel of the U.S.S. Jason, VT Squadron 20, and the U.S.S. Heron, and embarked on the Army launch Geary, proceeding to the American Rubber Company's plantation on the island of Basilan. This plantation has 250,000 rubber and 30,000 cocoanut trees.

A typhoon, centered to the eastward of the islands, struck the place. Planes 20-T-1 and 20-T-5 were moored inshore to 600 lb. moorings. The plane broke away and was rapidly blown toward the beach, where it would have been wrecked except for the action of the squadron officers who had foreseen such an accident, and for the help of the Army garrison. When the plane approached the beach, they waded out, caught it and kept it from going ashore on the rough coral beach. When it was found that the plane could not be towed off by the boats of the Jason and Heron, it was decided to work the plane down the beach to a sandy place where it was beached without serious damage. The plane remained there until a lull in the storm, when it was refloated and towed out to the Jason and hoisted aboard. The second plane (20-T-5) dragged her moorings about 200 yd. but held after her own anchor was dropped and secured to her. Local residents stated that this was the worst storm seen here in twenty years.

Pensacola Naval Station Resumes Training

The resumption of training at the Pensacola Naval Air Station, interrupted by the hurricane of Sept. 20, is reported by the Bureau of Aeronautics of the Department of the Navy. The bureau's announcement is in full as follows: Training activities at the Naval Air Station, Pensacola, Fla., have been reorganized to establish two departments covering all training of students. The flight school, in charge of Lieut. H. S. Sease

will have primary flight training and the technical school, in charge of Lieut. D. M. Carpenter, will have all other training activities. The technical school is organized in eight sections covering the activities of the former ground school, gunnery school, photographic school and advanced courses. Students reporting for training are assigned to the technical school which keeps all records and assigns students to the flight school as necessary for primary flight training.

Army Air Orders

First Lieut. Arnold H. Rich, Air Corps, Chanute Field, to Brooks Field.

Spec. Or. 207 amended so as to assign First Lieut. Leo F. Post, Air Corps, to Brooks Field, instead of Langley Field.

Spec. Or. 207 amended so as to assign First Lieut. Edward W. Raley, Air Corps, to Brooks Field instead of Langley Field.

Spec. Or. 171 amended so as to assign First Lieut. Hugh C. Minster, Air Corps, to Brooks Field instead of Selfridge Field.

Capt. Armin F. Herold, Air Corps, relieved from duty at Salt Lake City and additional duty at Woodward Field, and will proceed to San Francisco, sailing Apr. 23 for Canal Zone.

First Lieut. George W. Goddard, Air Corps, McCook Field, to New York City, sailing March 8 for the Philippine Islands.

First Lieut. Joseph P. Bailey, Air Corps, Kelly Field, and Sec. Lieut. Glen C. Jamison, Air Corps, Brooks Field, to San Francisco, sailing Apr. 23 for the Canal Zone.

First Lieut. Don W. Mayhue, Air Corps, Chanute Field, to New York City, sailing Apr. 1 for the Canal Zone.

First Lieut. Arthur J. Melanson, Air Corps, assigned to duty in the office of the Chief of Air Corps, Washington, upon completion of present tour of foreign service.

Following officers, upon completion of present tour of foreign service, to stations indicated: Capt. William M. Randolph, Kelly Field, First Lieuts. Roderick N. Ott, Brooks Field, Silas C. Hyndshaw, Chanute Field and Evers Abbey, Chanute Field.

First Lieut. Alfred I. Puryear, Air Corps, Walter Reed General Hospital, to Langley Field.

Navy Air Orders

Lieut. George R. Henderson det. Nav. Air Sta., Anacostia, to duty VO Sqd. 3, Aircraft Sqd., Setg. Flt.

Lieut. George T. Owen det. Nav. Air Sta., Anacostia, to duty with VO Sqd. 3, Aircraft Sqd., Setg. Flt.

Lieut. Troy N. Thweatt det. Nav. Oper. Base, Hampton Roads, to Obs. Plane Sqd. 6, Aircraft Sqd., Setg. Flt.

Lieut. (jg) Alfred R. Mead det. Torp. & Bomb Plane Sqd. 1, Aircraft Sqd., Setg. Flt., to Aircraft Sqd., Setg. Flt.

Ensign James R. Andrews det. Nav. Air Sta., Pensacola, to USS Tennessee.

Lieut. (jg) Nicholas A. Draim det. Navy Yard, New York, to Nav. Aircraft Factory, Navy Yard, Philadelphia.

Lieut. (jg) Emory P. Hylant det. USS Milwaukee, to temp. duty Nav. Air Sta., Pensacola.

Lieut. (jg) John E. Murphy det. USS Oklahoma, to temp. duty Nav. Air Sta., Pensacola.

Ensign Charles W. Oexle det. USS Oklahoma to temp. duty Nav. Air Sta., Pensacola.

Lieut. Joseph F. Bolger det. Aircraft Setg., Flt., to Nav. Torp. Sta., Newport.

Lieut. Daniel V. Gallery det. USS Idaho, to temp. duty Nav. Air Sta., Pensacola.

Lieut. (jg) Roy E. Carr det. USS Goff, to temp. duty Nav. Air Sta., Pensacola.

Lieut. (jg) Beverly E. Carter det. USS Lamson, to temp. duty Nav. Air Sta., Pensacola.

Lieut. (jg) Angus M. Cohan det. USS Childs, to temp. duty Nav. Air Sta., Pensacola.

Lieut. (jg) Edward R. Frawley det. Naval Academy, to temp. duty Nav. Air Sta., Pensacola.

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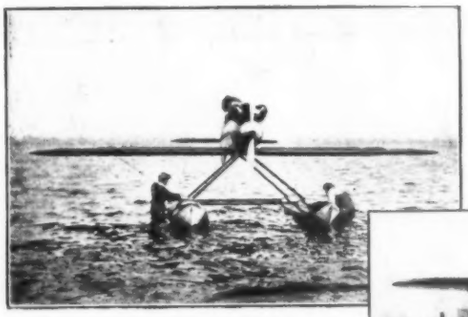

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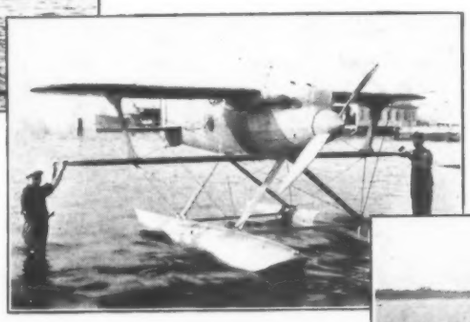

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